CLAIMS

What is claimed is:

1. A semiconductor device comprising a substrate, a fuse window above the substrate, and at least one device located under the fuse window.

2. A semiconductor device comprising a substrate, a fuse window above the substrate, and at least one interconnect structure located under the fuse window.

3. The semiconductor device of claim 1 wherein the at least one device includes at least one fuse circuit.

4. The semiconductor device of claim 3, wherein the fuse circuit comprises:

a fuse having a first end connected to a first voltage, and a second end;

a first transistor having a first current electrode (drain) connected to the second end of the fuse, a control electrode (gate) for receiving an input signal, and a second current electrode (source) connected to a second voltage;

a second transistor having a first current electrode connected to the second end of the fuse, a control electrode, and a second current electrode connected to the second voltage;

a first diode having an anode and a cathode, the anode of the first diode connected to the second voltage and the cathode of the first diode connected to the second end of the fuse;

a second diode having an anode and a cathode, the anode of the second diode connected to the second end of the fuse and the cathode of the second diode connected to the first voltage;

a resistor having a first end connected to the anode of the second diode, and a second end; and

an inverter having an input end connected to the second end of the resistor, and an output end connected to the control electrode of the second transistor for providing an output signal.

5. The semiconductor device of claim 4, wherein the fuse is a blowable fuse.

6. The semiconductor device of claim 4, wherein the first transistor is a metal-oxide semiconductor (MOS) transistor.

7. The semiconductor device of claim 6, wherein the MOS transistor is a N-type MOS (NMOS) transistor.

8. The semiconductor device of claim 4, wherein the second transistor is a metal-oxide semiconductor (MOS) transistor.

9. The semiconductor device of claim 8, wherein the MOS transistor is a N-type MOS (NMOS) transistor.

10. The semiconductor device of claim 3, wherein the fuse circuit comprises:

a fuse having a first end connected to a first voltage, and a second end;

a first transistor having a first current electrode (drain) connected to a second voltage, a control electrode (gate) for receiving an input signal, and a second current electrode (source) connected to the second end of the fuse;

a second transistor having a first current electrode connected to the second voltage, a control electrode, and a second current electrode connected to the second end of the fuse;

a first diode having an anode and a cathode, the anode of the first diode connected to the first voltage and the cathode of the first diode connected to the second end of the fuse;

a second diode having an anode and a cathode, the anode of the second diode connected to the second end of the fuse and the cathode of the second diode connected to the second voltage;

a resistor having a first end connected to the second end of the fuse, and a second end; and

an inverter having an input end connected to the second end of the transistor, and an output end connected to the control electrode of the second transistor for providing an output signal.

11. The semiconductor device of claim 10, wherein the fuse is a blowable fuse.

12. The semiconductor device of claim 10, wherein the first transistor is a metal-oxide semiconductor (MOS) transistor.

13. The semiconductor device of claim 12, wherein the MOS transistor is a P-type MOS (PMOS) transistor.

14. The semiconductor device of claim 10, wherein the second transistor is a metal-oxide semiconductor (MOS) transistor.

15. The semiconductor device of claim 14, wherein the MOS transistor is a P-type MOS (PMOS) transistor.

16. A fuse circuit for a semiconductor device comprising:

a fuse having a first end connected to a first voltage, and a second end;

a first transistor having a first current electrode (drain) connected to the second end of the fuse, a control electrode (gate) for receiving an input signal, and a second current electrode (source) connected to a second voltage;

a second transistor having a first current electrode connected to the second end of the fuse, a control electrode, and a second current electrode connected to the second voltage;

a first diode having an anode and a cathode, the anode of the first diode connected to the second voltage and the cathode of the first diode connected to the second end of the fuse;

a second diode having an anode and a cathode, the anode of the second diode connected to the second end of the fuse and the cathode of the second diode connected to the first voltage;

a resistor having a first end connected to the anode of the second diode, and a second end; and

an inverter having an input end connected to the second end of the resistor, and an output end connected to the control electrode of the second transistor for providing an output signal.

17. The fuse circuit of claim 16, wherein the fuse is a blowable fuse.

18. The fuse circuit of claim 16, wherein the first transistor is a metal-oxide semiconductor (MOS) transistor.

19. The fuse circuit of claim 18, wherein the MOS transistor is a N-type MOS (NMOS) transistor.

20. The fuse circuit of claim 16, wherein the second transistor is a metal-oxide semiconductor (MOS) transistor.

21. The fuse circuit of claim 20, wherein the MOS transistor is a N-type MOS (NMOS) transistor.

22. A fuse circuit for a semiconductor device comprising:

a fuse having a first end connected to a first voltage, and a second end;

a first transistor having a first current electrode (drain) connected to a second voltage, a control electrode (gate) for receiving an input signal, and a second current electrode (source) connected to the second end of the fuse;

a second transistor having a first current electrode connected to the second voltage, a control electrode, and a second current electrode connected to the second end of the fuse;

a first diode having an anode and a cathode, the anode of the first diode connected to the first voltage and the cathode of the first diode connected to the second end of the fuse;

a second diode having an anode and a cathode, the anode of the second diode connected to the second end of the fuse and the cathode of the second diode connected to the second voltage;

a resistor having a first end connected to the second end of the fuse, and a second end; and

an inverter having an input end connected to the second end of the transistor, and an output end connected to the control electrode of the second transistor for providing an output signal.

23. The fuse circuit of claim 22, wherein the fuse is a blowable fuse.

24. The fuse circuit of claim 22, wherein the first transistor is a metal-oxide semiconductor (MOS) transistor.

25. The fuse circuit of claim 24, wherein the MOS transistor is a P-type MOS (PMOS) transistor.

26. The fuse circuit of claim 22, wherein the second transistor is a metal-oxide semiconductor (MOS) transistor.

27. The fuse circuit of claim 26, wherein the MOS transistor is a P-type MOS (PMOS) transistor.

28. A semiconductor device comprising:
a semiconductor substrate;
at least one fuse circuit in the semiconductor substrate; and
a fuse window overlying the at least one fuse circuit.

29. A method of fabricating a semiconductor device comprising:
providing a semiconductor substrate;
forming at least one fuse circuit in the semiconductor substrate; and
forming a fuse window overlying the at least one fuse circuit.

30. The method of claim 29, wherein the fuse circuit comprises:
a fuse having a first end connected to a first voltage, and a second end;
a first transistor having a first current electrode (drain) connected to the second end of the fuse, a control electrode (gate) for receiving an input signal, and a second current electrode (source) connected to a second voltage;
a second transistor having a first current electrode connected to the second end of the fuse, a control electrode, and a second current electrode connected to the second voltage;

a first diode having an anode and a cathode, the anode of the first diode connected to the second voltage and the cathode of the first diode connected to the second end of the fuse;

a second diode having an anode and a cathode, the anode of the second diode connected to the second end of the fuse and the cathode of the second diode connected to the first voltage;

a resistor having a first end connected to the anode of the second diode, and a second end; and

an inverter having an input end connected to the second end of the resistor, and an output end connected to the control electrode of the second transistor for providing an output signal.

31. The method of claim 30, wherein the fuse is a blowable fuse.

32. The method of claim 30, wherein the first transistor is a metal-oxide semiconductor (MOS) transistor.

33. The method of claim 32, wherein the MOS transistor is a N-type MOS (NMOS) transistor.

34. The method of claim 30, wherein the second transistor is a metal-oxide semiconductor (MOS) transistor.

35. The method of claim 34, wherein the MOS transistor is a N-type MOS (NMOS) transistor.

36. The method of claim 29, wherein the fuse circuit comprises:

a fuse having a first end connected to a first voltage, and a second end;

a first transistor having a first current electrode (drain) connected to a second voltage, a control electrode (gate) for receiving an input signal, and a second current electrode (source) connected to the second end of the fuse;

a second transistor having a first current electrode connected to the second voltage, a control electrode, and a second current electrode connected to the second end of the fuse;

a first diode having an anode and a cathode, the anode of the first diode connected to the first voltage and the cathode of the first diode connected to the second end of the fuse;

a second diode having an anode and a cathode, the anode of the second diode connected to the second end of the fuse and the cathode of the second diode connected to the second voltage;

a resistor having a first end connected to the second end of the fuse, and a second end; and

an inverter having an input end connected to the second end of the transistor, and an output end connected to the control electrode of the second transistor for providing an output signal.

37. The method of claim 36, wherein the fuse is a blowable fuse.

38. The method of claim 36, wherein the first transistor is a metal-oxide semiconductor (MOS) transistor.

39. The method of claim 38, wherein the MOS transistor is a P-type MOS (PMOS) transistor.

40. The method of claim 36, wherein the second transistor is a metal-oxide semiconductor (MOS) transistor.

41. The method of claim 40, wherein the MOS transistor is a P-type MOS (PMOS) transistor.